

Prevalence Changes in Modifiable Cardiovascular Disease Risk Factors in Three Missouri Regions, 1990-1996

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ABSTRACT

Objectives: To determine the prevalence and prevalence trend of modifiable cardiovascular disease (CVD) risk factors among African Americans and whites/others from 1990-1996. We also examined differential changes between African Americans and whites/others during the same time period.

Methods: This study used data from two special Behavioral Risk Factor Surveillance System (BRFSS) based surveys in 1990 (N=3,000+) and one in 1996 (N=2,095) that targeted two metropolitan and one rural region in Missouri with substantial minority populations. Risk factors included physical inactivity, obesity, hypertension, unmonitored cholesterol and smoking. The percent change in prevalence estimates and corresponding confidence intervals between survey years were calculated for each of the above risk factors.

Results: When compared with Missouri BRFSS data, overall prevalence of smoking, obesity, hypertension and unmonitored cholesterol was higher in the three-region study population than the state as a whole. African-American males did not experience any statistically significant reductions in CVD risk factor prevalence rates between 1990 and 1996, while the increase in obesity was driven mostly by the African-American female subgroup. The least amount of reduction in CVD risk factors was seen in individuals aged 55 or older, with a high school education or less and/or without health insurance.

Conclusions: Individuals of African-American ethnicity, aged 55 or older, with a high school education or less and/or without health insurance need to

be the focus of future public health initiatives designed to reduce the prevalence of CVD risk factors.

Introduction

The prevalence of cardiovascular disease (CVD) risk factors and mortality has declined dramatically over the past 30 years. In Missouri, the mortality rate from CVD has decreased from 45% in 1989¹ to 34% in 1996.² However, CVD continues to be the leading cause of death, illness, disability and medical cost in the United States.^{3,4}

It is well known that CVD risk factors such as smoking, physical inactivity, obesity, hypertension and high blood cholesterol vary across population subgroups.⁴ CVD risk factors are highest in males and older individuals. However, CVD risk factor prevalence rates are also high for African Americans. National data show that whites have had a greater decline in death rate from heart disease than have African Americans. The current mortality rates from coronary heart disease and stroke are much greater in African-American males than in white males⁵, while data from California show that African-American females have the highest age-adjusted coronary heart disease death rate of all ethnic groups.⁴ It is currently estimated that 31% of excess mortality in African Americans can be related to the prevalence of modifiable CVD risk factors.⁶

In Missouri, African Americans have higher smoking rates than whites, males greater than females.⁵ Currently, more African Americans die of smoking-related diseases than of any other preventable cause of death.^{6,7} Physical inactivity rates are highest in Missouri among African Americans,

women and those living in the Bootheel.^{8,9} African-American females are almost twice as likely to be obese as white women,^{4,8} while there is no difference in obesity between African-American and white males.¹⁰ The rate of self-reported hypertension is similar for all males, while African-American females have higher rates than white females.¹¹ African-American males are the population subgroup most likely to have unmonitored cholesterol in the state of Missouri.⁵ However, cholesterol levels are higher in whites for both males and females, with females having higher cholesterol levels than males.^{12,13}

While there is a large literature on the relationship between CVD and ethnic minority groups, little is known about modifiable CVD risk factors among ethnic minority groups in the United States. This study analyzes changes in modifiable CVD risk factors in African Americans in the three study regions of the City of St. Louis, Kansas City and the Bootheel from 1990 to 1996. These changes were compared to changes that occurred among white/other ethnic groups in the same regions over the same time period. The results of this study and possible implications for public health are discussed.

Methods

Sampling: In 1996, the Missouri Department of Health Division of Chronic Disease Prevention and Health Promotion (MDOH-CDPHP), Office of Surveillance, Research and Evaluation and the Center for Advanced Social Research,

University of Missouri-Columbia School of Journalism conducted a survey jointly sponsored by CVD targeted health initiative funds and the Missouri Department of Health-Breast and Cervical Cancer Control Program (MDOH-BCCCP). Using random digit-dialing techniques, 2,095 individuals were sampled from specific Zip codes in the City of St. Louis, Kansas City and the Bootheel. Zip codes were selected that had a 40% or higher African-American population in the City of St. Louis and Kansas City, 20% or higher in the Bootheel.

MDOH-CDPHP conducted two surveys in 1990, both for intervention projects. First, a CVD project survey targeted residents of the Bootheel. Second, a Smoking Cessation among Black Americans (SCBA) project survey, initiated as part of a collaborative project with Washington University in St. Louis, targeted individuals in the City of St. Louis and Kansas City. These surveys targeted the same regions as the 1996 CVD survey, with the same interview strategy. The survey periods ended when a minimum of 1,000 surveys were completed in each survey region.

There were 1,006 completed interviews in the Bootheel, 1,050 completed interviews in the City of St. Louis and 1,042 completed interviews in Kansas City.

A description of the sampling method used for all three surveys can be found elsewhere.^{14,15} The completion rates for the surveys were 88% for the 1990 Bootheel CVD project, 80-82% for the SCBA survey and 61% for the City of St. Louis and Kansas City components of the 1996 survey; the 1996 Bootheel rate was not available.

Analysis: Based on their self-reported responses, survey respondents were categorized according to sociodemographic variables of age (18-34; 35-54; 55 and older), gender, race/ethnicity (African American; white/other), region (City of St. Louis; Kansas City; Bootheel) and educational attainment (less than a high school education; high school education; more than a high school education). Respondents were also categorized by presence or absence of health care coverage.

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Figure 1: Percent change in current smoking by sociodemographics and health care coverage, 1990-1996

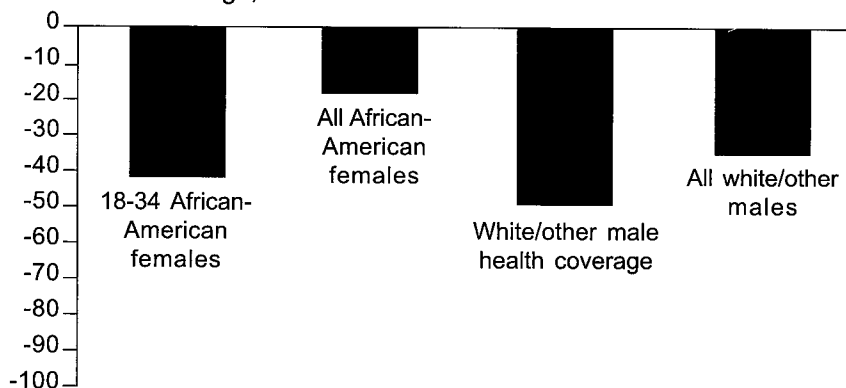
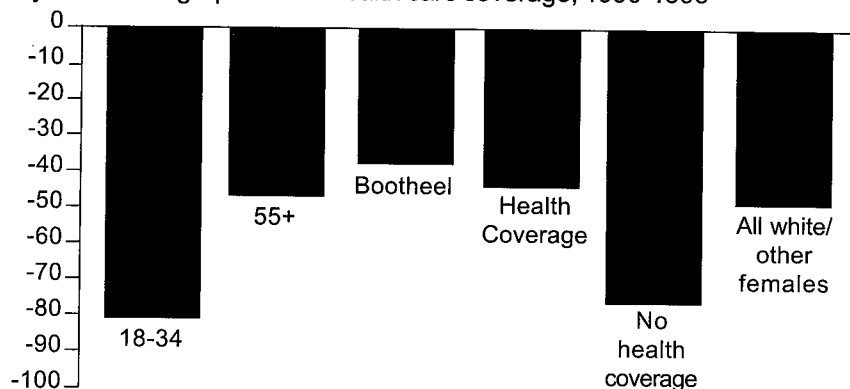


Figure 2: Percent change in physical activity among white/other females by sociodemographics and health care coverage, 1990-1996



When necessary, we weighted data to compensate for unequal probability of sampling selection as a function of stratification, clustering, number of telephone numbers and number of adults per household. We also weighted the data to compensate for unequal representation of the source population according to sex, race and age.

For each survey year, we generated race- and gender-specific prevalence estimates and 95% confidence intervals for the modifiable CVD risk factors smoking, physical inactivity, obesity, hypertension and unmonitored cholesterol. Investigators also generated race- and gender-specific percentage change in prevalence estimates of risk factors from 1990 to 1996, and corresponding 95% confidence intervals across the sociodemographic and health care coverage categories described above.

Results

The 1996 survey respondents were mostly individuals aged 45

or older (52.2%), female (62.5%), African American (63%), with a high school education or less (55.9%) and/or with an annual household income of \$15,000 or less (41.1%). The sample had an almost equal representation in the study regions.

The 1990 SCBA survey respondents were mostly individuals aged 18-34 (36.7%), female (65.3%), African-American (74.8%), with a high school education or less (62.9%) and/or with an annual household income of \$15,000 or less (44.6%). The sample had an almost equal representation of respondents from St. Louis City and Kansas City.

The 1990 CVD survey respondents were mostly individuals aged 55 or older (42.1%), female (61.5%), white/other ethnicity (93.4%), with a high school education or less (76.7%) and/or with an annual household income of \$15,000 or less (38.9%).

Current Smoking: From 1990 to 1996, there was a statistically nonsignificant downward trend in overall smoking preva-

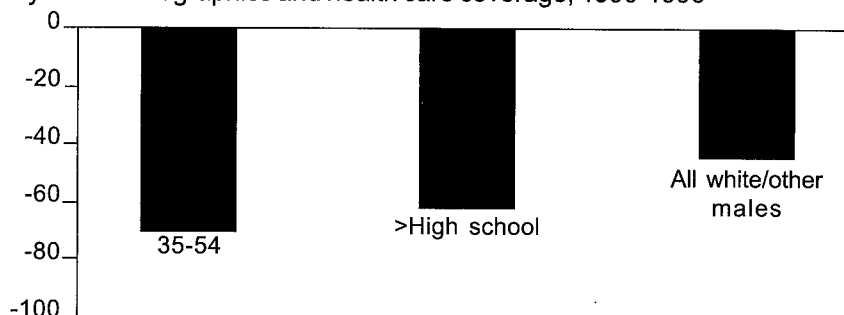
lence. A statistically significant downward trend in prevalence was observed among persons with health insurance coverage, which further stratification reveals to have occurred primarily among white/other males (Figure 1). A statistically significant downward trend in smoking prevalence was also observed among African-American females aged 18-34 (Figure 1).

African-American males were the only population subgroup to exhibit an increase in current smoking rates, from 34.7% in 1990 to 36.5% in 1996. However, this increase was statistically nonsignificant. White/other males experienced the greatest decrease in smoking rates, from 42.1% in 1990 to 27.7% in 1996. This decrease was statistically nonsignificant.

In 1996, the three-region estimated prevalence of current smoking was 29.0%. This prevalence was highest among individuals aged 35-54 (39.6%), with less than a high school education (41.7%) and without health coverage (45.9%). These differences were consistent across categories of gender and race.

Physical Inactivity: From 1990 to 1996, there was a statistically significant decrease in physical inactivity over the study regions. There was also a statistically significant decrease in physical inactivity among residents of Kansas City that was not seen in any Kansas City population subgroup. Further stratification by gender and race reveals that no statistically significant

Figure 3: Percent change in physical inactivity among white/other males by sociodemographics and health care coverage, 1990-1996



changes occurred among African Americans. Statistically significant decreases among the white/other female group were identified in the Bootheel region, in the youngest and oldest age groups (18-34 and 55+), among females with and without health insurance coverage and among the whole population subgroup (Figure 2). White/other female physical inactivity decreased from 32.9% in 1990 to 17.6% in 1996, the lowest of the four population subgroups. White/other males in the middle age group (35-54) and with greater than high school education also experienced a statistically significant decrease in physical inactivity (Figure 4). There was a statistically nonsignificant decrease in physical inactivity in the City of St. Louis and the Bootheel, as well as among those with no health insurance coverage.

The three-region estimated prevalence of physical inactivity was 25% in 1996. The overall rate shows variation by age and education, with the highest rates among persons aged 55 and older (34.8%) and with less than a high school education (35.4%). A higher rate of physical inactivity

was observed for females vs. males (28.3% vs. 21.0%). This difference was mostly driven by gender differences observed among African Americans (33.6% for females and 22.5% for males vs. 17.6% and 19.0% for white/other).

Obesity: From 1990 to 1996, there was an overall statistically significant upward trend in obesity. This trend is driven exclusively by African Americans, especially African-American females. Statistically significant upward trends in prevalence of obesity were observed among persons living in the City of St. Louis and persons with health insurance coverage, which further

stratification reveals to have occurred primarily in African-American females. A statistically significant upward trend was also observed for African-American females with more than a high school education and in the population subgroup as a whole (Figure 4). Obesity among African-American females increased from a rate of 40.5% in 1990 to 52.7% in 1996. White/other females show a statistically nonsignificant decrease in prevalence of obesity, while white/other males show no change between 1990 and 1996. White/other female obesity rates decreased from 32.9% in 1990 to 25.8% in 1996, the lowest rate of all population subgroups.

The three-region estimated prevalence of obesity was 40.1% in 1996. This result shows variation by age and education, with the highest rates among persons aged 55 and older (47.0%) and those with less than a high school education (48.4%). Obesity rates increased with age and decreased with educational

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Figure 4: Percent change in obesity among African-American females by sociodemographics and health care coverage, 1990-1996

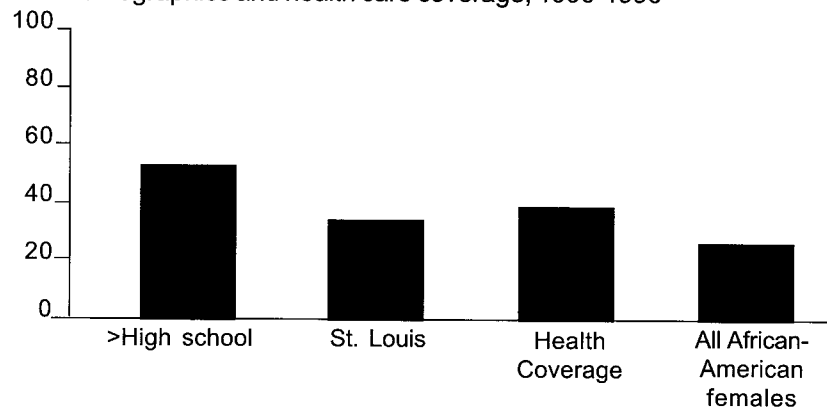


Figure 5: Percent change in hypertension among white/other females by sociodemographics and health care coverage, 1990-1996



attainment. After stratification by gender and race, however, only the variation by age remained.

Hypertension: Analysis of the 1990 and 1996 estimates indicates a general statistically nonsignificant trend toward increased prevalence of lifetime hypertension. A statistically significant upward trend in prevalence of hypertension was observed among persons with health insurance coverage, which was not seen in gender or race population subgroups. A statistically significant downward trend in prevalence of hypertension was observed among white/other females aged 18-34 (Figure 5).

Overall statistically nonsignificant downward trends in prevalence of hypertension were observed in African-American males and white/other females. White/other females experienced a decrease from a rate of 26.4% in 1990 to 22.4% in 1996, the lowest current rate of all population subgroups. Overall statistically nonsignificant upward trends in prevalence of hypertension were observed in African-American females and white/other males. African-American females experienced an increase

from a rate of 34.3% in 1990 to 39.5% in 1996, the highest rate of all population subgroups.

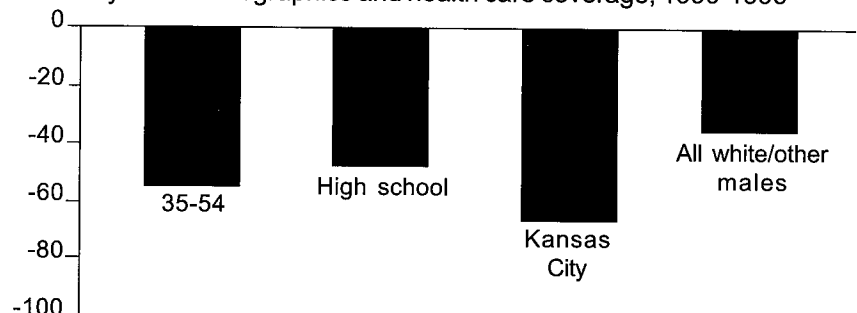
The three-region estimated lifetime prevalence of self-reported hypertension was 30.4% in 1996. Overall prevalence of hypertension increased with age from 11.4% among persons aged 18-34 to 56.2% among persons aged 55 and older, decreased with education from 47.8% among those with greater than a high school education to 24.3% among those with less than a high school education and was higher among respondents with health care coverage than those without coverage (32.9% vs. 20.2%). While the age effect was consistent across gender and race strata, the health care coverage effect was apparent only among

African Americans and the education effect apparent only among females.

Unmonitored Cholesterol:

From 1990 to 1996, there was a statistically nonsignificant downward trend in the prevalence of unmonitored cholesterol. Only African-American males did not experience this downward trend. An overall statistically significant downward trend in prevalence was observed among persons aged 35-54 and Kansas City residents. Further stratification reveals that the downward trend in the respondents aged 35-54 occurred principally in white/other males and African-American females (Figures 6 and 7, respectively). The decrease in Kansas City occurred primarily in white/other males. A statistically significant downward trend in the prevalence of unmonitored cholesterol was observed in the white/other male population subgroup, who experienced a decrease from a rate of 52.4% in 1990 to 34.2% in 1996. White/other males also experienced a statistically significant downward trend in those with more than a high school education and with health care coverage.

Figure 6: Percent change in unmonitored cholesterol among white/other males by sociodemographics and health care coverage, 1990-1996



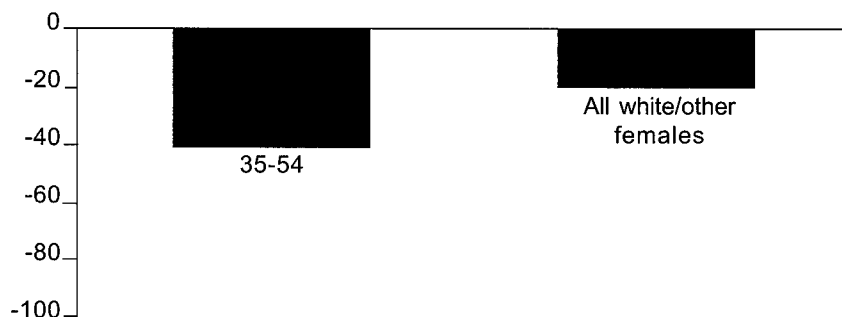
The three-region estimated prevalence of unmonitored cholesterol was 37% in 1996. Unmonitored cholesterol prevalence decreased with age in a linear fashion, from a high of 53.5% among persons aged 18-34 to a low of 22.6% among persons aged 55 and older; decreased with education from a high of 43.7% for those with less than a high school education to a low of 30.4% among those with greater than a high school education and decreased with health care coverage (33%). After further stratification, differences by educational and health coverage status were only present among African-American females. A higher rate of unmonitored cholesterol was observed for males vs. females (42.5% vs. 32.4%), which was apparent among whites/others (34.2% vs. 27.2%) and African Americans (47.8% vs. 35%).

Discussion

The results of this study show that in 1996, African Americans in the three-region study area had a higher prevalence rate of all modifiable CVD risk factors than did members of the white/other group. Overall, individuals aged 55 or older, with a high school education or less and/or without health insurance coverage experienced higher prevalence rates of modifiable CVD risk factors.

Overall prevalence rates of smoking, obesity, hypertension and unmonitored cholesterol in the study regions were higher than

Figure 7: Percent change in unmonitored cholesterol among African-American females by sociodemographics and health care coverage, 1990-1996



for the state of Missouri.^{11,16}

Only the overall prevalence rate of physical inactivity was lower in the study regions than in the state of Missouri.¹⁶

From 1990-1996, African-American males living in the study area did not experience any statistically significant changes in the prevalence of CVD risk factors. This is also true when compared to white/other males, even after stratification by age, region, education and health care coverage. They are the only racial and gender subgroup to experience no statistically significant improvement in CVD risk factors over the study period. African-American females experienced a statistically significant increase in obesity, while white/other females are the only racial and gender population subgroup that did not experience an increase in any CVD risk factor from 1990-1996.

Considering the study results, African-American females with a greater than high school education experienced a statistically significant increase in the prevalence of obesity, while all males in the study region with a greater than high school education experienced

a decrease in obesity. The prevalence of smoking also decreased among individuals with a greater than high school education, as well as among those with health care coverage. Individuals with health care coverage experienced an increase in the prevalence of obesity and hypertension during the study period. Individuals without health care coverage experienced a decrease in the prevalence of physical inactivity. The prevalence of physical inactivity also decreased more among younger individuals and those living in Kansas City and the Bootheel.

Nationally as well as in Missouri, African Americans experience both higher CVD and CVD risk factor prevalence rates than other ethnic groups.^{3-5,16,17} This fact, combined with the relatively slow decrease of modifiable CVD risk factor prevalence rates, could pose serious health risks for African Americans living in the three-region study area of Missouri, the state of Missouri and nationwide.

Miller and colleagues show that smoking was directly attributable for almost 20% of all deaths

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in Missouri in 1995.⁷ Of these deaths, 65% were among males. African Americans in this study had higher smoking rates than other ethnic groups and also showed a slower rate of decrease from 1990-1996. However, there was no difference in smoking rates by race in Missouri, after controlling for age, sex and education.⁷ Statewide, individuals aged 18-34, males and those with less than a high school education were more likely to be smokers. Individuals in the three-region study area who are African-American, aged 18-34, male and/or with less than a high school education may be more likely to die from a smoking-related cause and have a decreased life expectancy due to smoking, among other factors.

While the decrease in the prevalence of physical inactivity was statistically significant from 1990-1996 in the three-region study period, physical inactivity is still a problem, especially among African Americans. The rate of physical inactivity among African-American females is much higher than the other three population subgroups. In fact, African-American females are the only population subgroup to exhibit a higher rate of physical inactivity than the state as a whole. The majority of the decrease in physical inactivity was attributable to the white/other group, while overall physical inactivity decreased only slightly during the study period. The results from the three-region study area are similar to the statewide results. Physical inactivity rates are highest among African Americans, females, individuals with

less than a high school education and/or those over the age of 55.¹⁶

In the 1990 and 1996 surveys, African-American females had the highest rate of obesity. In 1996, the rate of obesity was slightly over twice as great among African-American females as among white/other females, which corresponds to national data.⁸ Statewide, the rate of obesity is highest for African Americans.¹⁶ Stratification by race and gender in the three-region study area shows that African-American females experienced the greatest increase in obesity among racial and gender population subgroups from 1990-1996. However, over the past 10 years, males were more likely to be obese in Missouri without stratification by race.¹⁶ In addition, obesity rates in Missouri were highest among those with less than a high school education and those between the ages of 35 and 64.¹⁶

Obesity is related to many other health outcomes, such as hypertension and elevated cholesterol levels. Obese individuals are at increased risk of illnesses such as type 2 diabetes, coronary heart disease, stroke, osteoarthritis, respiratory problems and certain cancers.¹⁸ The rise in obesity in Missouri, particularly among African-American females, poses a potential public health threat that requires immediate intervention.

The study results for self-reported hypertension are consistent with national reports. Blood pressure increases with advancing age, especially among African Americans.¹⁹ In addition, the great discrepancy seen in hyper-

tension between African-American and white/other females is consistent with other studies.⁶

Elevated cholesterol levels may be indicative of a high-fat diet, lack of exercise and/or smoking.¹² Study results of unmonitored cholesterol rates are consistent with national studies, and those done within Missouri.²⁰ African-American males are the least likely population subgroup to have their cholesterol levels checked.⁵ Although the rate of elevated cholesterol levels is higher among white/others and females, it is still important for all individuals to have their cholesterol levels checked.^{11,12}

The results of our study are consistent with recent studies specific to Missouri and for the nation as a whole. Although there was some improvement in the prevalence of CVD risk factors, this prevalence is still high in the three-region study area. This is particularly true for African Americans. In the study area, as well as nationally, obesity is increasing in some subgroups while physical inactivity is decreasing in others.¹⁶ The increase in obesity is mainly driven by African-American females, while the decrease in physical inactivity is mainly driven by members of the white/other group. The rate of smoking is decreasing, but not at the level projected for year 2000 objectives.¹³ More people are getting their cholesterol levels checked, but not at the rate projected for year 2000 objectives.²⁰

This study has a number of strengths. The sample is population-based, with a good representation of the regions studied. The

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sample population includes an over-representation of African Americans compared to the state as a whole. Limitations of the study include issues associated with all telephone surveys. A telephone survey by definition leaves out those households without a telephone. The results rely on self-reported data, possibly leading to under-reporting of undesirable behaviors. There may also be a lack of accurate recall. However, studies have shown that hypertension, cholesterol screening and leisure time physical activity variables, as used in this study, are reliable.^{21,22} Two of the three regions in this study are urban. Previous research has shown²³ that smoking is more prevalent in urban areas than in non-urban areas when all other factors are controlled for. This study only measures if respondents have had their cholesterol checked; it does not address cholesterol levels. Finally, physical inactivity is measured only by leisure time activity; occupational activity is not measured.

Public health measures are being taken in Missouri to reduce CVD risk factors. Currently, the Missouri Department of Health is implementing a comprehensive CVD initiative aimed at changing policy and community-wide infrastructure that is conducive to improving CVD risk behavior. The observed increase in CVD risk factor prevalence rates over the study period was mainly due to increases among the African-American population. These increases in risk behavior may lead to increased rates of CVD in the African-American population. The differences between the study regions and the state as a whole may be due to the higher concentration of African Americans in the study regions. It is widely recognized that African Americans have worse cardiovascular health than the population as a whole.^{4,14} In Missouri, the age-adjusted mortality rate from CVD was 45% higher in African Americans than whites in 1994.²⁴ The difference in age-adjusted mortality rates between African Americans and whites has increased from 1980 to 1994. This is true for all forms of CVD, including coronary heart disease and stroke.²⁴ Therefore, African Americans should be given priority in public health initiatives designed to decrease CVD risk factors in Missouri. It is especially important to address the increasing rate of obesity among African-American females and the lack of improvement in prevalence rates for all CVD risk factors among African-American males. CVD is

largely preventable, especially if prevention practices are incorporated into everyday life. However, factors within the community, such as an environment conducive to exercise, incentive to monitor cholesterol and blood pressure and diet, may influence the rate of CVD. Further research is necessary to identify problem areas and improve upon existing intervention measures. **MoMed**

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